

A New Nematode (Spirurida, Physalopteridae) from Frill Shark of Japan

By

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A new nematode belonging to the family Physalopteridae was obtained from a primitive, deep-sea frill shark, *Chlamydoselachus anguineus*, caught off the Pacific coast of central Honshu, the main island of Japan. On the other hand, the larva was also found lying on the brain of a deep-sea bristlemouth, *Cyclothone atraria*, taken from the Pacific coast of northern Honshu. The life cycle of this nematode is briefly speculated.

The nematodes were preserved in 70% ethanol and cleared in glycerin or Gater's solution. The specimens are deposited in the collection of the National Science Museum (Nat. Hist.), Tokyo.

We are grateful to Dr. Toru TANIUCHI, Faculty of Agriculture, University of Tokyo, who afforded an opportunity to collect the parasites of the frill shark. Thanks are also due to Dr. Elmer R. NOBLE, University of California, and Dr. Yuzo KOMAKI, Far Seas Fisheries Research Laboratory, for providing valuable specimens.

Order Spirurida

Family Physalopteridae

Metaleptus rabuka gen. et sp. n.

(Figs. 1-4)

Habitat. Stomach and intestine of *Chlamydoselachus anguineus* (Selachii, Chlamydoselachina), Japanese name "rabuka".

Locality. Off Choshi, Pacific coast of central Honshu, main island of Japan.

Date. 17-IV-1980.

Specimen No. NSMT-As 1629.

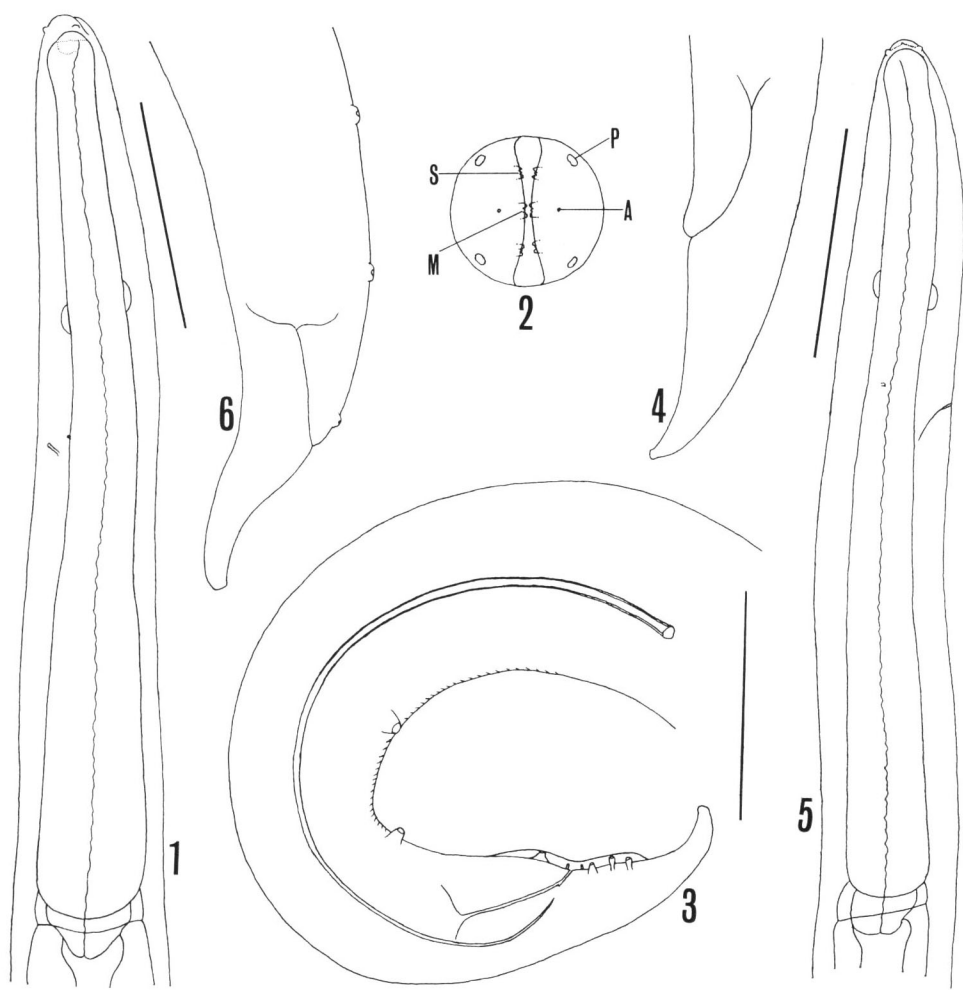
Description. Cuticle with very fine transverse striations. Mouth with two lateral pseudolabia, each bearing two submedian cephalic papillae and a lateral amphid. Inner surface of each labium carrying three bi- or trifurcate teeth; one situated medially, the other two submedially (subdorsally and subventrally). Cephalic collarette absent. Esophagus with anterior end somewhat swollen, undivided and connected with intestine at a short interval where well-developed esophagointestinal valve inserted. Nerve ring near junction between anterior and middle third of esophagus. Cervical papillae and excretory pore lying at midlevel of esophagus. Intestine dark brown in color. Tail gradually tapering, with blunt tip.

Male. Body spirally coiled posteriorly, 22.8–31.7 mm long and 0.42–0.50 mm wide at middle region. Pseudolabia 41–43 μ long. Esophagus 1.85–2.08 mm long, 6.6–8.1 % of body length, and 0.20–0.22 mm wide near its posterior end. Nerve ring, cervical papillae and excretory pore 0.64–0.71 mm, 0.90–0.95 mm and 0.90–1.02 mm from head end, respectively. Esophagointestinal valve 77–87 μ long. Caudal alae poorly developed, not extending to tip of tail. Four pairs of precloacal and four pairs of postcloacal papillae pedunculate; of them anterior two pairs do not support the caudal alae, and two pairs nearest to the cloacal opening are small with short peduncles. Spicules equal and similar, 1.53–1.78 mm long, 5.8–7.8 % of body length. Tail 0.28–0.36 mm long.

Female. Body 29.0–33.9 mm long and 0.67–0.92 mm wide at vulvar region. Pseudolabia 46–59 μ long. Esophagus 1.82–2.22 mm long, 5.5–7.7 % of body length, and 0.16–0.23 mm wide near its posterior end. Nerve ring, cervical papillae and excretory pore 0.67–0.74 mm, 0.91–1.09 mm and 0.98–1.13 mm from head end, respectively. Esophagointestinal valve 87–133 μ long. Vulva in posterior half of body, 18.6–24.8 mm from head end and divides body length in proportion of 1.8–3.1:1. Vagina running forward; uterus amphidelphic. Uterine eggs oval, 117–138 $\times$ 84–102 μ . Tail 0.47–0.53 mm long.

Discussion. The taxonomy of the family Physalopteridae from fish seems to be confused. According to CHABAUD (1975), the subfamily Proleptinae, separated from the Thubunaecinae, contains four genera, *Proleptus*, *Paraleptus*, *Heliconema* and *Bulbocephalus*. On the other hand, SPECIAN *et al.* (1975) included six genera, *Proleptus*, *Paraleptus*, *Heliconema*, *Dogielina*, *Neoleptus* and *Pseudoproleptus*, in the subfamily Physalopterinae from fish.

The present genus mostly resembles *Paraleptus* in having caudal alae, equal and similar spicules, and the vulva located far from the anus, but differs from it in having no cephalic collarette, the esophagus being undivided and connected with the intestine at a short interval where the esophagointestinal valve is inserted. Of the above genera, only the *Bulbocephalus* does not have the cephalic collarette, but it has protrusible esophageal lobes. The esophagointestinal valve lying at a short interval between esophagus and intestine is also peculiar to the present genus.



Figs. 1-6. *Metaleptus rabuka* gen. et sp. n. — 1-4. Adult from *Chlamydoselachus anguineus*. — 1. Anterior end of male. — 2. Apical view of head end. — 3. Posterior end of male. — 4. Posterior end of female. — 5-6. Larva from *Cyclothone atraria*. — 5. Anterior end of larval male. — 6. Posterior end of larval male. A, amphid; M, median tooth; S, submedian tooth; P, cephalic papilla. Scales 0.5 mm.

Metaleptus gen. n.

Mouth with two lateral pseudolabia, each bearing two submedian cephalic papillae and a lateral amphid. Inner surface of each labium having three bi- or trifurcate teeth; one medially, the other two submedially. Cephalic collarette absent. Esophagus undivided, and connected with intestine at a short interval where well-developed

esophagointestinal valve inserted. Excretory pore and cervical papillae situated at same level, some distance posterior to nerve ring. Tail with blunt tip. Male:— Body spirally coiled posteriorly. Caudal alae poorly developed. Four pairs of precloacal and four pairs of postcloacal papillae pedunculate; of them anterior two pairs do not support caudal alae. Spicules equal and similar. Female:— Vulva in posterior half of body, far from anus. Uterus amphidelphic. Parasitic in gut of selachians.

Type-species: *Metaleptus rabuka* sp. n.

Ecological note. One of us (M. O.) has examined 1050 specimens of *Cyclothone* spp. caught in depths of from 500–1000 m off Sanriku District, Pacific coast of northern Honshu, the main island of Japan, and found 13 specimens of *C. atraria* to be infected with a coiled nematode larva on top of the brain (Fig. 7).

We examined the four male larvae (Figs. 5–6): Body 13.0–22.0 mm long by 0.32–0.48 mm wide. Cuticle with very fine transverse striations. Mouth bounded by two lateral pseudolabia, each having two submedian cephalic papillae on the outside and a median tooth on the inside. Cephalic collarette absent. Esophagus with anterior end slightly swollen, 1.33–1.78 mm long, undivided and connected with intestine at a short interval where well-developed esophagointestinal valve inserted. Nerve ring, cervical papillae and excretory pore 0.50–0.53 mm, 0.73–0.75 mm and 0.73–0.76 mm from head end, respectively. Three pairs of precloacal papillae present. Tail 0.26–0.37 mm long, with blunt tip. By the above characteristics, the larvae from *Cyclothone atraria* are identified as those of *Metaleptus rabuka*.

NOBLE (1973) stated that “I have examined 36 *Cyclothone* spp. for their protozoan and metazoan parasites, and found one tightly coiled nematode larva, lying on top of the brain of *C. acclinidens* . . .” (P. 159). The fish was captured at a depth of 900 m off southern California on December 9, 1966. He did not identify the larva and recently sent it to us for examination. Unfortunately, the specimen was broken into many pieces, so our examination indicated only that his and our larvae had similar caudal extremities. It may possibly be a larval *Metaleptus rabuka*. The known geographical ranges of these two species of *Cyclothone* and *Chlamydoselachus anguineus* tend to support this identification (MUKHACHEVA, 1974; MATSUBARA, 1965).

There seems to be no available information on the life cycle of the related nematodes except *Proleptus obtusus*, which is parasitic in *Scyllium canicula* and utilizes hermit crabs, *Carcinus maenas* and *Eupagurus bernhardus*, as intermediate hosts (LLOYD, 1928).

We speculate the life cycle of *Metaleptus rabuka* as follows: The egg hatches in the intestine of the frill shark or sea water, and the larva is ingested by copepods. When the infected copepod is ingested by *Cyclothone*, the larva migrates from the alimentary canal to the brain, where it coils tightly. The stomachs of *Cyclothone* contain many copepods and some chaetognaths, amphipods and ostracods (DEWITT & CAILLIET, 1972). Upon ingestion by frill shark which inhabits the same depth as *Cyclothone* and feeds on fishes and squids, the larva develops to maturity in the stomach and

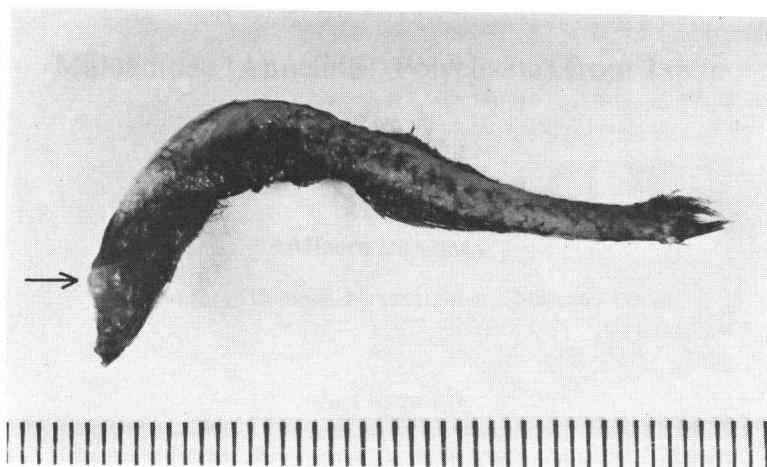


Fig. 7. *Cyclothone atraria* with a larva of *Metaleptus rabuka* on top of the brain (arrow). Scale in mm.

intestine. The nematode requires not less than three hosts for the completion of its development, but it is not clear whether *Cyclothone* is an intermediate or a paratenic host.

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